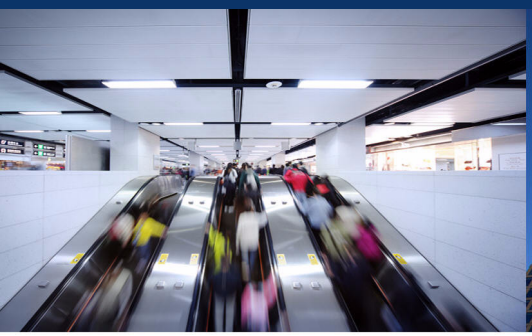
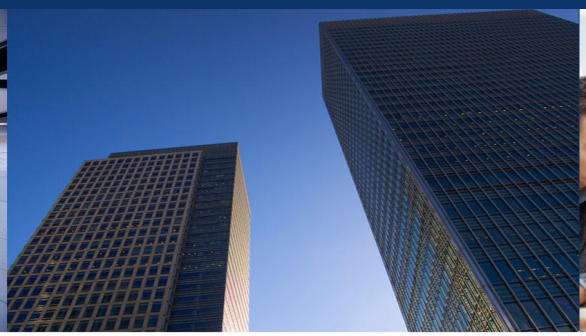
ORiNOCO® 802.11n Access Points

Hardware Installation Guide

Products Covered

ORiNOCO® AP-800
ORiNOCO® AP-8000
ORiNOCO® AP-8100

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ORiNOCO® 802.11n Access Points - Hardware Installation Guide

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Contents

Preface 4

1 Introduction 6

About ORiNOCO® 802.11n Access Points 6

Salient Features 6

Multiple-Input-Multiple-Output 7

2 Hardware Overview and Installation 8

ORiNOCO® AP-800 and AP-8000 9

Hardware Overview 9

System Requirements 10

Product Package 11

Installation Procedure 12

ORiNOCO® AP-8100 15

Front View of the Device 15

Rear View of the Device 16

System Requirements 16

Product Package 17

Installation Procedure 18

3 Hardware Specifications 22

ORiNOCO® AP-800 and AP-8000 22

ORiNOCO® AP-8100 24

A Glossary and Abbreviations 26

B Statement of Warranty 30

C Technical Services and Support 32

Preface

This chapter contains information on the following:

- About this Guide
- Products Covered
- Audience
- Prerequisites
- Documentation Conventions
- Related Documents

About this Guide

This guide gives a jump-start working knowledge on the ORiNOCO® 802.11n Access Points and details on their hardware specifications and installation procedures.

Products Covered

Listed below are the products covered in this guide.

- ORiNOCO® AP-800
- ORiNOCO® AP-8000
- ORiNOCO® AP-8100

Audience

The intended audience for this guide is the Network Administrator who installs and/or manages the device.

Prerequisites

The reader of this guide should have working knowledge of Wireless Networks, Local Area Networking (LAN) concepts, Network Access Infrastructures and Client-Server Applications.

Documentation Conventions

Icon Representation

Name	Image	Description
Note		A special instruction that draws attention of a user.
Important		A note of significant importance that a user should be aware of.
Caution		A warning that cautions a user of the possible danger.

Related Documents

For more information, please refer to the following additional documents that are available at proxim's support site http://support.proxim.com.

- **Quick Installation Guide (QIG)** - A quick reference guide that provides essential information to install and configure the device.
- **Software Management Guide** - A guide that provides instructions on how to configure, manage and monitor the device by using Web Interface.
- **Reference Guide** - A guide that provides instructions on how to configure, manage and monitor the device by using Command Line Interface.
- **Safety and Regulatory Compliance Guide** - A guide that provides country specific safety and regulatory norms to be followed while installing the devices.

: For regulatory information and latest product updates, visit our support site http://support.proxim.com.

Introduction 1

This chapter contains information on the following:

- About ORiNOCO® 802.11n Access Points
- Salient Features
- Multiple-Input-Multiple-Output

1.1 About ORiNOCO® 802.11n Access Points

Proxim's ORiNOCO® 802.11n Access Point family comprises the following products, that are designed to deliver flexible, scalable and reliable Data, Voice, and Video for small and medium Enterprise WLAN deployments.

Product(s)	Description	Image
ORiNOCO® AP-800	An indoor 802.11n Access Point with dual-band, 3x3 MIMO (Multiple Input and Multiple Output) single radio which operates either in 2.4 or 5 GHz. This connectorized unit comes with 3 omni-directional antennas.	
ORiNOCO® AP-8000	An indoor 802.11n Access Point with dual-band, 3x3 MIMO (Multiple Input and Multiple Output) dual-radio, where one operates in 5GHz and other in 2.4GHz. This connectorized unit comes with 6 omni-directional antennas, 3 per radio.	
ORiNOCO® AP-8100	An indoor 802.11n Access Point with 2x2 MIMO (Multiple Input and Multiple Output) dual-radio, where one operates in 5GHz and other in 2.4GHz. This unit comes with 4 integrated antennas, 2 per radio.	

1.2 Salient Features

- Industry-leading throughput in 802.11b/g/n and 802.11a/n modes in 2.4GHz and 5GHz respectively.
- Highest throughput with single radio rates of 150 - 170 Mbps and dual radio rates of 250 - 320 Mbps.
- Advanced WPA/WPA2 support for enterprise-grade security.
- Wi-Fi certified to interoperate with any Wi-Fi certified client access product.
- Provides wall or ceiling mounting options for flexible device installation.
- Centralized Management with distributed WLANs.
- Management through a Web Interface (HTTP), Command Line Interface (CLI), Simple Network Management Protocol (SNMP) and Network Management System (ProximVision ES v2.3 and above).

: Managing the device through Network Management System (ProximVision ES) is applicable only to AP-800 and AP-8000.

1.3 Multiple-Input-Multiple-Output

ORiNOCO® Access Point devices support Multiple-Input-Multiple-Output (MIMO) antenna technology that uses multiple antennas at both the transmitting end and receiving end to improve communication performance. The underlying technology of these access point radio(s) are based on a combination of MIMO and OFDM (Orthogonal Frequency Division Multiplexing). MIMO-OFDM combination radios solve interference, fading and multipath problems. Having multiple receivers at the receiving end, increases the amount of received power and also reduces multipath problems by combining the received signals for each frequency component separately. Hence, MIMO significantly improves the overall gain.

MIMO also uses Spatial multiplexing transmission technique to transmit independent and separately encoded data signals from each of the multiple transmit antennas while reusing or multiplexing in the space dimension. These independent data signals are called Spatial streams. The transmitting end of the device uses multiple radio Tx chains and signal paths to simultaneously transmit different data streams, whereas the receiving end combines the Rx signals resulting in higher throughput.

By increasing the number of receiving and transmitting antennas, the throughput of the channel increases linearly resulting in high spectral efficiency.

Hardware Overview and Installation

2

This chapter covers the hardware overview and installation procedures of the following products:

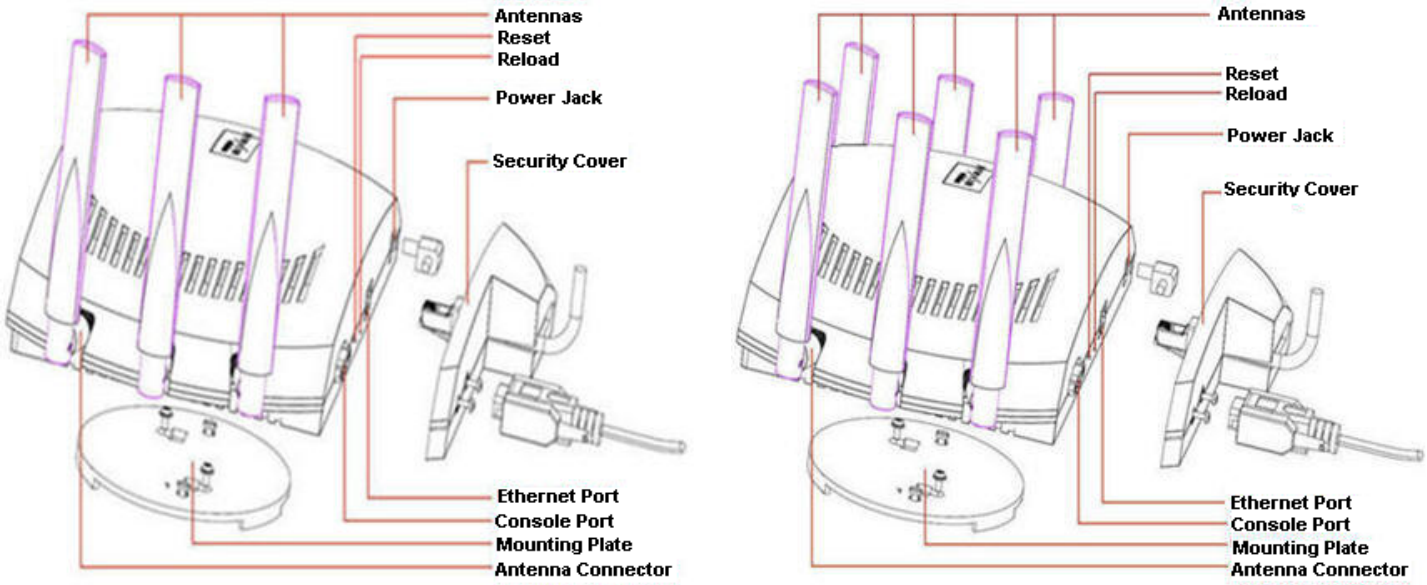
- ORiNOCO® AP-800 and AP-8000
  - Hardware Overview
  - System Requirements
  - Product Package
  - Installation Procedure
- ORiNOCO® AP-8100
  - Front View of the Device
  - Rear View of the Device
  - System Requirements
  - Product Package
  - Installation Procedure

:

- **All the interface (radio) 2 parameters discussed in this chapter are applicable only to a dual-radio device.**
- **For a quick reference on how to install and mount the device, please refer to the ORiNOCO® AP-800, AP-8000, and AP-8100 *Quick Installation Guides* respectively.**

2.1 ORiNOCO® AP-800 and AP-8000

2.1.1 Hardware Overview



ORiNOCO® AP-800 **ORiNOCO® AP-8000**

Figure 2-1 Device Overview

Following sections give you a hardware overview of AP-800 and AP-8000.

2.1.1.1 LED Indicators

Tabulated below are the four LEDs, that are available on the top panel of the device:

LED	Symbol	Description
Power LED		This LED indicates whether the device is switched on/off.
Ethernet LED		This LED signals the traffic on the wired ethernet LAN.
Wireless Interface (Radio) 1 LED		This LED provides the status of the traffic on wireless interface (radio) 1.
Wireless Interface (Radio) 2 LED		This LED provides the status of the traffic on wireless interface (radio) 2.

2.1.1.2 Antennas

The device comes with 3x3 MIMO omni-directional antennas that are easy to install. Proxim also recommends you an optional accessory- **Range Extender Antenna (REA)**, which has 3 x RP SMA plug, that can be easily connected to the device. See Installation Procedure, for details on installation of antennas.

: AP-800 comes with a single radio and 3 omni-directional external antennas. AP-8000 comes with two radios and 6 omni-directional antennas, 3 per radio.

2.1.1.3 Power Socket

This socket connects to the 5 VDC power adapter.

2.1.1.4 Reset

Reset button enables a user to powercycle the device.

2.1.1.5 Reload

Reload feature helps to restore the device to factory default configuration, when:

- The device cannot be accessed through web interface or command line interface.
- The device does not initialize.
- The password is lost.

For more details, see *Recovery Procedures* and *Forced Reload* procedures, detailed in the *ORiNOCO® 802.11n Access Points - Software Management Guide*.

2.1.1.6 Ethernet Port

The Ethernet Port of the device allows the user to connect to the LAN by using CAT5e / CAT6 ethernet cable.

2.1.1.7 Serial Port

The device has RS-232 connector by using which serial communication can be established, for debugging and management.

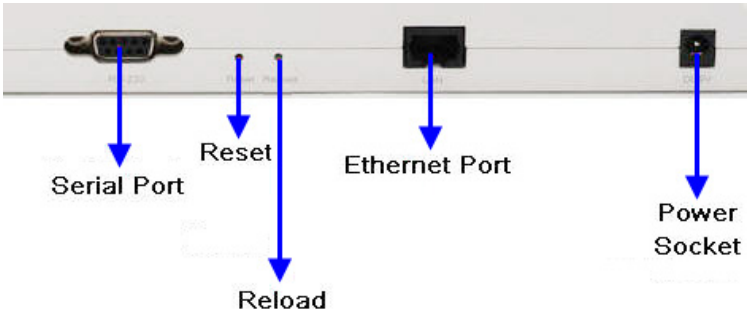


Figure 2-2 Rear View of the Device

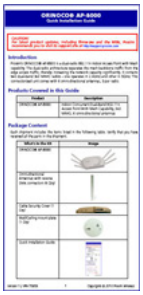
2.1.2 System Requirements

Following are the minimum system requirements to use the device:

1. Any 802.11 compliant wireless adapter.
2. A computer that is connected to the same IP network as the AP and has one of the following installed:
   - Web Browser
   - Telnet
   - RS-232 Serial Port
   - MIB Browser
   - Ethernet NIC Card
3. Ethernet switch, cross-over or straight Ethernet cable.
4. A 5V DC Power Adapter or a Power over Ethernet (PoE) Adapter

2.1.3 Product Package

Each shipment includes the items listed in the following table. Please verify that you have received all the parts in the shipment, prior to the installation.

What's in the Kit	Image
ORiNOCO® AP-800 or AP-8000	OR
Omni-directional Antennas with reverse SMA connectors. • AP-800 : Quantity - 3 • AP-8000: Quantity - 6	
Cable Security Cover	
Mounting Kit	
Quick Installation Guide (QIG)	

2.1.3.1 Optional Accessories

Tabulated below are the recommended optional accessories, that are supplied on request from Proxim Wireless Corporation.

Accessory	Image
110-220V worldwide Power Adapter	
Range Extender Antenna (REA)	
Gigabit Ethernet PoE	

2.1.4 Installation Procedure

Perform the following steps to install and mount the device.

2.1.4.1 Step 1: Install the Antennas

The omni-directional antennas supplied with the product do not require any professional installation. Only, the regular outdoor antennas connected via a pigtail conversion cable, offering a standard connector type for antenna connection, require a professional installation.

: Optionally, you can use the Range Extended Antenna (REA), which has 3 x RP SMA plug, that can be easily connected to the device.

Perform the following steps to assemble the antennas:

1. Hand-tighten the antennas clockwise, onto the external connectors of the device until they are attached firmly.
2. Position the antennas close to the horizontal surface (ceiling or wall), so as to get the maximum signal coverage of the omni-directional antenna.

2.1.4.2 Step 2: Mount the Device

Consider the following precautions, before mounting the device:

- The device must be protected from exposure, and the environmental conditions must be within those specified in the product datasheet, that can be found at http://support.proxim.com.
- Ensure to use a +5V/3.5 A power adapter, to power on the device.

:

- *Note that the device is build with fire retardant ATX200 resin and can be installed in the plenum. In an office building, plenum is the space between the structural ceiling and the tile ceiling that is provided to help air circulate. Many companies also use the plenum to house communication equipment and cables. These products and cables must comply with certain safety requirements, such as Underwriter Labs (UL) and Standard 2043: "Standards for Fire Test for Heat and Visible Smoke Release for Direct Products and Their Accessories installed in Air-Handling Spaces".*
- *When installed in a plenum, the device must use PoE.*

Conduct a site survey to determine the best location for the device. You can either mount the device to a wall or mount it to the T-bar ceiling, as follows:

Wall-Mounting:

To mount the device to a wall, follow the following steps:

1. If the device is powered on, unplug all the power cables.
2. Place the mounting plate on the wall with the embossed inverted letter "L" facing your right, as shown below:

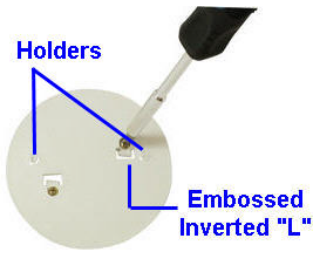


Figure 2-3 Mounting Plate

3. Fasten the mounting plate by using a pair of plastic anchors and screws provided with the product package.
4. Hold the device with its rear panel facing up. Next, align two keyholes on the device with the two holders on the mounting plate.
5. Carefully slide the device down until the holders on the mounting plate fasten securely onto the keyholes of the device.

Figure 2-4 Mount the Device

Ceiling Mounting:

To mount the device to ceiling, follow the following steps:

1. If the device is powered on, unplug all the power cables.
2. Place the mounting plate onto the ceiling with the embossed inverted letter "L" facing your right. Refer Mounting Plate
3. Fasten the mounting plate by using a pair of plastic anchors and screws provided with the product package.
4. Hold the device with its rear panel facing front. Next, align two keyholes on the device with the two holders on the mounting plate.
5. Carefully slide the device towards rear side until the holders on the mounting plate fasten securely onto the keyholes of the device.

2.1.4.3 Step 3: Plugging in the Cables

Cabling with Power Adapter (Not supplied with the product package)

To plug in the cables by using a 5V DC power adapter:

- Connect one end of the CAT5e/CAT6 Ethernet cable (not supplied with the product) to the device's ethernet port and the other end to a PC.
- Plug the barrel of the power cable into the device's power socket, only after the device installation is complete.

Cabling with Gigabit PoE (Not supplied with the product package)

To use Power over Ethernet (PoE), we recommend you to use our Gigabit Ethernet PoE adapter ORiNOCO 1-Port Active Ethernet DC Injector (See Optional Accessories) and follow the following guidelines:

- Connect one end of the ethernet cable to the **Data In** port of the DC Injector and the other end to a PC.
- Connect one end of the second ethernet cable (not supplied with the product) to the device's ethernet port, and the other end to the **Data & Power Out** Port of the DC Injector, only after the device installation is complete.

: PoE should be installed only in an indoor network, maintaining a controlled temperature.

Serial Connection

Optionally, you can connect a nine-pin, male-to-female serial cable to the console port/DB9 connector of the device for debugging and management.

- *Use a straight-through ethernet cable, if you intend to connect the device to a switch, hub, or patch panel.*
- *Use a cross-over ethernet cable or adapter if you intend to connect the device to a single computer.*
- *The pin6 on RJ11 connector is used for power consumption and debugging. This connects internally to the 12VDC.*
- *If power is drawn from this input pin, then the radio might malfunction.*

2.1.4.4 Step 4: Power On the Device

To power on the device, plug in the power cord into a power outlet. There is no ON/OFF switch on the device. To disconnect power:

- Unplug the RJ45 connector from the **Data & Power Out** port on the DC injector, if using the Gigabit Ethernet PoE.
- Unplug the power cable from the power socket of the device, if using power adapter.

2.1.4.5 Step 5: View LEDs

When the device is powered on, it performs startup diagnostics. When startup is complete, the LEDs show the operational state of the device. Tabulated below is the behavior of the four LEDs on the device:

LED	Behavior	Color
Power LED	Glows green when the device is switched ON.	
Ethernet LED	Glows red when the ethernet interface is connected to a 100 Mbps link.	
	Glows green when the ethernet interface is connected to a 1000 Mbps link.	
Wireless Interface (Radio) 1 LED	• The Wireless LEDs glow steady green in operational status. • Blinks green, if wireless traffic is being transmitted or received.	
Wireless Interface (Radio) 2 LED		

: The LEDs glow 'orange' when the device initializes.

2.1.4.6 Step 6: Install Cable Security Cover (Optional)

When the RS-232 cable is not connected, we recommend you to install a cable security cover to prevent the power socket, LAN ports, reset and reload buttons from getting tampered. Follow the following procedure to install the cable security cover:

1. Open the split end of the security cover just enough to slide the power cable (if the Gigabit Ethernet PoE is not used) and the CAT6 ethernet cable through the opening until they fit inside the straight clamping portion of the cover.
2. Exercise care, as you slide the cable(s) so that you do not accidently break the cover.
3. Slide the hinging end of the security cover and insert the latch into the hole at the rear end of the device.
4. Insert the two screws into the screw holes near serial port and fasten the security cover on the device.

2.2 ORiNOCO® AP-8100

2.2.1 Front View of the Device

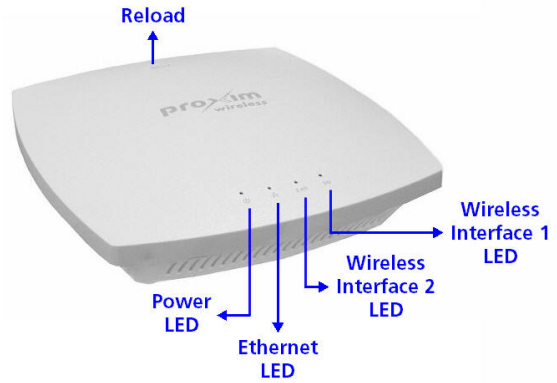


Figure 2-5 Front View of the Device

The front panel of the device contains the following components:

2.2.1.1 LED Indicators

Tabulated below are the four LEDs, that are available on the front panel of the device:

LED	Symbol	Description
Power LED		This LED indicates whether the device is switched ON/OFF.
Ethernet LED		This LED indicates the status of the traffic over the wired ethernet LAN.
2.4G (Wireless Interface 2) LED	2.4G	This LED indicates the status of the traffic over the wireless interface (radio) 2.
5G (Wireless Interface 1) LED	5G	This LED indicates the status of the traffic over the wireless interface (radio) 1.

2.2.1.2 Reload

Reload feature helps to restore the device to factory default configuration, when:

- The device cannot be accessed through web interface or command line interface.
- The device does not initialize.
- The password is lost.

For more details, see *Recovery Procedures* and *Forced Reload* procedures, detailed in the *ORiNOCO® 802.11n Access Points - Software Management Guide*.

2.2.2 Rear View of the Device

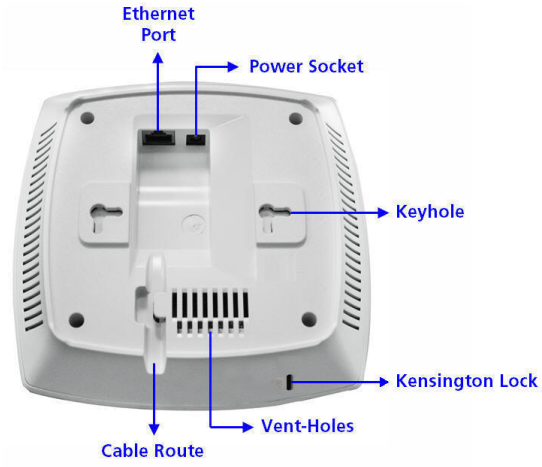


Figure 2-6 Rear View of the Device

The rear panel of the device contains the following components:

2.2.2.1 Ethernet Port

The Ethernet port of the device allows the user to connect to the LAN by using CAT5e / CAT6 ethernet cable.

2.2.2.2 Power Socket

This socket connects to the 12 VDC power adapter.

2.2.2.3 Keyhole

A provision to fix the device onto the mounting plate.

2.2.2.4 Kensington Lock

A security slot to lock the device.

2.2.2.5 Cable Route

A slot for the CAT5e / CAT6 ethernet cable and the power cable to rest securely.

2.2.2.6 Vent-Holes

Ventilation holes on the device allow heat dissipation.

2.2.3 System Requirements

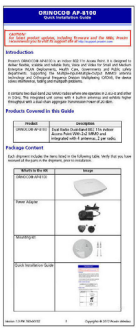
Following are the minimum system requirements to use the device:

1. Any 802.11 compliant wireless adapter.
2. A computer that is connected to the same IP network as the AP and has one of the following installed:
   - Web Browser
   - Telnet
   - MIB Browser
   - Ethernet NIC Card
3. Ethernet switch, cross-over or straight Ethernet cable.

4. A 12V DC Power Adapter or a Power over Ethernet (PoE) Adapter.

2.2.4 Product Package

Each shipment includes the items listed in the following table. Please verify that you have received all the parts in the shipment, prior to the installation.

What's in the Kit	Image
ORiNOCO® AP-8100	
Mounting Kit	
Power Adapter (Supplied with country specific plug)	 ** Supplied only with the WD SKU.*
Quick Installation Guide (QIG)	

2.2.4.1 Optional Accessories

Tabulated below are the recommended optional accessories, that are supplied on request from Proxim Wireless Corporation.

Accessory	Part Number	Image	Description
PoE Adapter (US/CAN/JP Power Cord)	76282		PoE module helps you to power ON the device via ethernet cabling.
PoE Adapter (EU Power Cord)	76288		
PoE Adapter (UK Power Cord)	76287		

2.2.5 Installation Procedure

Perform the following steps to mount and install the device.

2.2.5.1 Step 1: Plugging in the Cables

Cabling with Power Adapter (Supplied with the product package)

To plug in the cables by using a 12V DC power adapter:

- Connect one end of the CAT5E/CAT6 Ethernet cable to the device's ethernet port and the other end to a PC.
- Plug the barrel of the power cable into the device's power socket, only after the device installation is complete.

: Use a cable-tie to ensure that the power cable stays intact with the device power socket.

Cabling with Gigabit PoE (Not supplied with the product package)

To use Power over Ethernet (PoE), we recommend you to use our Gigabit Ethernet PoE adapter ORiNOCO 1-Port Active Ethernet DC Injector (See Optional Accessories) and follow the following guidelines:

- Connect one end of the ethernet cable to the **Data In** port of the DC Injector and the other end to a PC.
- Connect one end of the second ethernet cable to the device's ethernet port, and the other end to the **Data & Power Out** Port of the DC Injector, only after the device installation is complete.

: PoE should be installed only in an indoor network, maintaining a controlled temperature.

2.2.5.2 Step 2: Mount the Device

Consider the following precautions, before mounting the device:

- The device must be protected from exposure, and the environmental conditions must be within those specified in the product datasheet that can be found at http://support.proxim.com.
- Ensure to use a +12V/1.25 A power adapter, to power on the device.
- Ensure that there is no power supply, until the device installation is complete.

:

- *Note that the device is build with fire retardant ATX200 resin and can be installed in the plenum. In an office building, plenum is the space between the structural ceiling and the tile ceiling that is provided to help air circulate. Many companies also use the plenum to house communication equipment and cables. These products and cables must comply with certain safety requirements, such as Underwriter Labs (UL) and Standard 2043: "Standards for Fire Test for Heat and Visible Smoke Release for Direct Products and Their Accessories installed in Air-Handling Spaces".*
- *When installed in a plenum, the device must use PoE.*

Conduct a site survey to determine the best location for the device. You can either mount the device to a wall or mount it to the T-bar ceiling, as follows:

Wall-Mounting:

To mount the device to a wall:

1. Place the mounting plate on the wall such that the embossed letter 'L' is at the top-center position and the vent-holes are facing your left hand side.

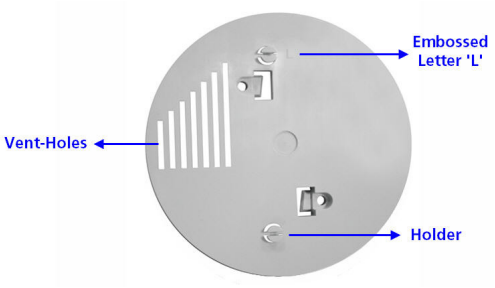


Figure 2-7 Mounting Plate

2. Fasten the mounting plate by using a pair of plastic anchors and screws provided with the product package.
3. Hold the device in the upright position (with 'Reload' on top and the 'LEDs' at the bottom), such that the vent-holes on the device and the vent-holes on the mounting plate rest on each other.
4. Align the two keyholes on the device with the two holders on the mounting plate.
5. Carefully, slide the device towards your right hand side, until the holders on the mounting plate fasten securely onto the keyholes of the device.

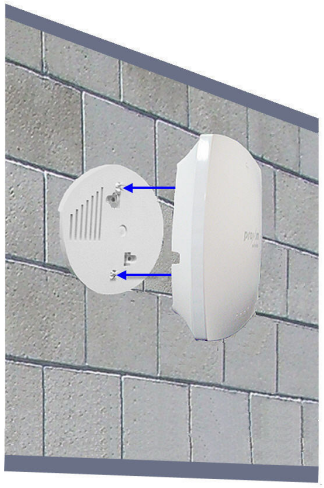


Figure 2-8 Wall Mounting

Ceiling Mounting:

1. Place the mounting plate on the T-bar ceiling such that the embossed letter 'L' is at the top-center position and the vent-holes are facing your left hand side.
2. Fasten the mounting plate by using a pair of plastic anchors and screws provided with the product package.
3. Hold the device with its rear panel facing the mounting plate, such that the vent-holes on the device and the vent-holes on the mounting plate rest on each other.
4. Align the two keyholes on the device with the two holders on the mounting plate.
5. Carefully, slide the device towards your right hand side, until the holders on the mounting plate fasten securely onto the keyholes of the device.

Figure 2-9 Ceiling Mounting

Mounting AP-8100 to AP-800/8000 mounting plate (Optional)

In case, you are mounting AP-8100 to an already installed AP-800/8000 Mounting Plate (P/N 67439), then follow the following steps.

Wall Mounting:

1. Hold the device such that the 'Reload' is towards your right hand side and the 'LEDs' towards left hand side.
2. Align the two keyholes on the device with the two holders on the mounting plate.
3. Carefully, slide down the device until the holders on the mounting plate fasten securely onto the keyholes of the device.

Ceiling Mounting:

1. Hold the device such that the rear panel of the device is facing the mounting plate, with 'Reload' towards your right hand side and 'LEDs' towards left hand side.
2. Align the two keyholes on the device with the two holders on the mounting plate.
3. Carefully, slide the device backwards until the holders on the mounting plate fasten securely onto the keyholes of the device.

: Ensure that the mounting plate is fixed in the similar fashion, as described in AP-800/AP-8000 mounting procedures (See Installation Procedure).

2.2.5.3 Step 3: Power On the Device

To power on the device, plug in the power cord into a power outlet. There is no ON/OFF switch on the device. To disconnect power:

- Unplug the power cable from the power socket of the device, if using power adapter.
- Unplug the RJ45 connector from the **Data & Power Out** port on the DC injector, if using the Gigabit Ethernet PoE.

2.2.5.4 Step 4: View LEDs

When the device is powered on, it performs startup diagnostics. When startup is complete, the LEDs show the operational state of the device. Tabulated below is the behavior of the four LEDs on the device.

LED	Symbol	Behavior	Color
Power LED		Glows green when the device is switched ON.	
Ethernet LED		• Glows green when the device is connected to a 1 Gbps link. • Blinks green when the traffic is being transmitted or received on the 1 Gbps link.	
		• Glows amber when the device is connected to a 100 Mbps link. • Blinks amber when the traffic is being transmitted or received on the 100 Mbps link.	
		• Glows red when the device is connected to a 10 Mbps link. • Blinks red when the traffic is being transmitted or received on the 10 Mbps link.	
2.4 GHz LED		• Glows green when the wireless interface 2 is in operational state. • Blinks green when wireless traffic is being transmitted or received.	
5 GHz LED		• Glows green when the wireless interface 1 is in operational state. • Blinks green when wireless traffic is being transmitted or received.	

: When the Reload button is pressed, the Power LED glows ***amber****.*

3 Hardware Specifications

This chapter covers the hardware specifications of the following products:

- ORiNOCO® AP-800 and AP-8000
- ORiNOCO® AP-8100

3.1 ORiNOCO® AP-800 and AP-8000

Category	Specification
Radio Module	Single Radio Access Point (AP-800) / Dual Radio Access Point (AP-8000) 3x3 MIMO per radio
Wireless Protocol	802.11a/n 802.11a 802.11g/n 802.11g
Frequency	5.150 - 5.850 GHz* 2.4 - 2.483 GHz* * Subject to Individual Country Regulations
Channel bandwidth	20MHz and 40MHz for 802.11n 20MHz for 802.11a/b/g
Modulation	• MCS0 - MCS15 for 802.11n (6.5 Mbps -300 Mbps) • BPSK, QPSK, 16-QAM and 64-QAM for 802.11a and 802.11g (6 Mbps - 54 Mbps) • DSSS for 802.11b (1 Mbps -11 Mbps)
Device Interface	**Ethernet**: Auto-sensing 10/100/1000BASE-T Ethernet **Antenna Connector**: 3 RP-SMA connectors for AP-800 6 RP-SMA connectors for AP-8000
LED Indicators	Refer Step 5: View LEDs
Antennas	3 Single-Band (AP-800) / 6 Dual-Band (AP-8000) Omni-Antennas and reverse SMA connector with 3 dBi gain.
Network Architecture Type	Infrastructure
Transmit Power	See table below

Operational Modes	Transmit Power* (dBm)	
	20 MHz	40 MHz
802.11b	19	-
802.11a/g	17	-
802.11na/ng	16	14

** Combined Tx Power values*

<table>
<tr><td>Receive Sensitivity</td><td>
<table>
<tr><th colspan="2">11b</th><th colspan="2">11a/g</th><th colspan="2">11n</th></tr>
<tr><th>Data Rate (Mbps)</th><th>Receive Sensitivity (2.4-5Ghz)</th><th>Data Rate (Mbps)</th><th>Receive Sensitivity (2.4-5Ghz)</th><th>Data Rate (MCS*)</th><th>Receive Sensitivity (2.4-5Ghz)</th></tr>
<tr><td>1</td><td>-94</td><td>6</td><td>-96</td><td>MCS 0</td><td>-90</td></tr>
<tr><td>11</td><td>-91</td><td>36</td><td>-87</td><td>MCS 8</td><td>-91</td></tr>
<tr><td>-</td><td>-</td><td>48</td><td>-83</td><td>MCS 10</td><td>-83</td></tr>
<tr><td>-</td><td>-</td><td>54</td><td>-82</td><td>MCS 15</td><td>-72</td></tr>
</table>
*MCS refers to Modulation Coding Scheme.
</td></tr>
<tr><td>Local Configuration Support</td><td>RS-232 Serial port, DB9 Female</td></tr>
<tr><td>Remote Configuration Support</td><td>Telnet and SSH, Web GUI (http) and SSL (https), TFTP
SNMP v1, v2c and v3
SNMP trap and Syslog
PVES (ProximVision ES Network Management Systems)</td></tr>
<tr><td>Message Authentication</td><td>802.11i AES message authentication with 128 bit keys
TKIP with 128 bit Michael Message Integrity Check</td></tr>
<tr><td>Intrusion detection</td><td>Detect MIC intrusion attacks</td></tr>
<tr><td>Certifications</td><td>Wi-Fi Certification - Enterprise 802.11 a/b/g/n</td></tr>
<tr><td>Dimensions
(L x W x H)</td><td>11.1 x 6.85 x 1.89 in. (282 x 174 x 48 mm)
 : These dimensions exclude the antennas.</td></tr>
<tr><td>Weight</td><td>AP-800 - 0.7 Kgs (1.54 lbs)
AP-8000 - 0.75 Kgs (1.65 lbs)</td></tr>
<tr><td>Environmental</td><td>Operating Temperatures:
0 to 55ºC
5 to 95 percent (non-condensing)
Storage Temperature:
-20º to 75ºC</td></tr>
<tr><td>MTBF</td><td>43,800 hrs</td></tr>
<tr><td>Warranty</td><td>One year parts/labor</td></tr>
</table>

3.2 ORiNOCO® AP-8100

<table>
<tr><th>Category</th><th>Specification</th></tr>
<tr><td>Power Requirements</td><td>Power Adapter: 12V/1.25A
Power over Ethernet (PoE) (optional): 48V / Any 803.3af compliant Gigabit PoE</td></tr>
<tr><td>Radio Module</td><td>Dual Radio Access Point, 2x2 MIMO per radio
Radio1: IEEE 802.11a/n
Radio2: IEEE 802.11b/g/n</td></tr>
<tr><td>Wireless Protocol</td><td>802.11a/n
802.11a
802.11g/n
802.11g</td></tr>
<tr><td>Frequency</td><td>5.150 - 5.850 GHz*
2.4 - 2.483 GHz
* Subject to Individual Country Regulations</td></tr>
<tr><td>Channel bandwidth</td><td>20MHz and 40MHz for 802.11n
20MHz for 802.11a/b/g</td></tr>
<tr><td>Modulation</td><td>• BPSK, QPSK, 16-QAM and 64-QAM:
– With data rates of 6.5 Mbps -300 Mbps for 802.11n
– With data rates of 6 Mbps - 54 Mbps for 802.11a and 802.11g
• DSSS, CCK: With data rates of 1 Mbps -11 Mbps for 802.11b</td></tr>
<tr><td>Device Interface</td><td>Ethernet: Auto-sensing 10/100/1000BASE-T Ethernet</td></tr>
<tr><td>LED Indicators</td><td>Refer Step 4: View LEDs</td></tr>
<tr><td>Antennas</td><td>4 Modular High Efficiency built-in PIFA Antennas with a peak gain of:
– 3dBi for 2.4 GHz frequency.
– 4dBi for 5 GHz frequency.</td></tr>
<tr><td>Network Architecture Type</td><td>Infrastructure</td></tr>
<tr><td>Transmit Power</td><td>
<table>
<tr><th colspan="2">11b</th><th colspan="2">11a/g</th><th colspan="2">11n</th></tr>
<tr><th>Data Rates (Mbps)</th><th>Transmission Power*</th><th>Data Rates (Mbps)</th><th>Transmission Power*</th><th>Data Rate (MCS*)</th><th>Transmission Power*</th></tr>
<tr><td rowspan="3">1 to 11</td><td rowspan="3">20</td><td rowspan="2">6 to 48</td><td rowspan="2">20</td><td>MCS 0 to 5</td><td>20</td></tr>
<tr><td>MCS 6</td><td>19</td></tr>
<tr><td>54</td><td>20</td><td>MCS 7</td><td>17</td></tr>
</table>
* Combined Tx Power values
* MCS refers to Modulation Coding Scheme.
</td></tr>
</table>

<table>
<tr><td>Receive Sensitivity</td><td>
<table>
<tr><th colspan="2">11b</th><th colspan="2">11a/g</th><th colspan="3">11n</th></tr>
<tr><th rowspan="2">Data Rate (Mbps)</th><th rowspan="2">Receive Sensitivity (2.4-5Ghz)</th><th rowspan="2">Data Rate (Mbps)</th><th rowspan="2">Receive Sensitivity (2.4-5Ghz)</th><th rowspan="2">Data Rate (MCS*)</th><th colspan="2">Receive Sensitivity (2.4/5Ghz)</th></tr>
<tr><th>20 MHz</th><th>40 MHz</th></tr>
<tr><td>1</td><td>-93</td><td>6</td><td>-90</td><td>MCS 0</td><td>-87</td><td>-86</td></tr>
<tr><td>11</td><td>-90</td><td>54</td><td>-75</td><td>MCS 7</td><td>-70</td><td>-66</td></tr>
</table>
* MCS refers to Modulation Coding Scheme.
</td></tr>
<tr><td>Remote Configuration Support</td><td>Telnet and SSH, Web GUI (http) and SSL (https), TFTP
SNMP v1, v2c and v3
SNMP trap and Syslog</td></tr>
<tr><td>Message Authentication</td><td>802.11i AES message authentication with 128 bit keys
TKIP with 128 bit Michael Message Integrity Check</td></tr>
<tr><td>Intrusion detection</td><td>Detect MIC intrusion attacks</td></tr>
<tr><td>Certifications</td><td>Wi-Fi Certification - Enterprise 802.11 a/b/g/n</td></tr>
<tr><td>Dimensions (L x W x H)</td><td>6.69 x 6.69 x 1.74 in. (170 x 170 x 44.1 mm)</td></tr>
<tr><td>Weight</td><td>0.340 kg (0.75 lbs)</td></tr>
<tr><td>Environmental</td><td>Operating Temperatures:
0 to 45ºC
5 to 95 percent (non-condensing)
Storage Temperature:
- 40º to 70ºC</td></tr>
<tr><td>MTBF</td><td>>100,000 hrs</td></tr>
<tr><td>Warranty</td><td>One year parts/labor</td></tr>
</table>

Glossary and Abbreviations

A

Glossary

A	
Access point	A wireless network transceiver or "base station" hub, often used to connect a local area network to one or more wireless devices. An access point (also called AP) can provide a communication link to a wired local area network also.
Advanced Encryption Standard (AES)	It is a symmetric-key encryption standard, containing three block ciphers AES-128, AES-192, AES-256. Each of these ciphers has a 128-bit block size, with key sizes of 128, 192 and 256 bits, respectively.

D	
Dual-Band	Dual-band refers to a device's ability to function on two different frequency bands.

H	
HTTP/HTTPS	Hypertext Transfer Protocol (HTTP) is the protocol to transport Web pages. When you access the Internet with your browser, the HTTP protocol is used for data transport (http://www.Tsunamiwireless.com). When you access the unit by using the Web Interface, HTTP is used to transport the information. HTTPS is the Secure Hypertext Transfer Protocol.

M	
Management Information Base (MIB)	A Management Information Base (MIB) is a formal description of a set of network objects that can be managed with the Simple Network Management Protocol (SNMP). A MIB can be loaded by a management application so that it knows the unit specific objects.

O	
Orthogonal Frequency Division Multiplexing (OFDM)	OFDM is a frequency-division multiplexing (FDM) scheme, a method of encoding digital data on multiple carrier frequencies. A large number of closely spaced orthogonal sub-carrier signals are used to carry data. The data is divided into several parallel data streams/channels, one for each sub-carrier, maintaining total data rates similar to conventional single-carrier modulation schemes in the same bandwidth.

S	
ScanTool	Proxim's ScanTool is a software utility that runs on Microsoft Windows machine. By using ScanTool, you can • Scan devices (Proxim devices only) available on the network • Obtain device's IP address • Modify device's IP Configuration parameters (IP Address, Address Type, Gateway and so on) • Launch the Web interface • Switch between the network adapters, if there are multiple network adapters in the Personal Computer
Simple Network Management Protocol (SNMP)	A protocol used for the communication between a network management application and the devices it is managing. The network management application is called the SNMP manager and the devices it manages will have SNMP agents. Not only the unit but also almost every network device contains a SNMP agent. The manageable objects of a device are arranged in a Management Information Base, also called MIB. The Simple Network Management Protocol (SNMP) allows managers and agents to communicate for accessing these objects.
Single-Band	Single-band refers to a device's ability to function only on one frequency band.

T	
TCP / IP	The TCP/IP internet-suite protocol describes a set of general design guidelines and implementations of specific networking protocols to enable computers to communicate over a network. TCP/IP provides end-to-end connectivity specifying how data should be formatted, addressed, transmitted, routed and received at the destination.
Telnet	Telnet is a network protocol used on the Internet or local area networks to access the command-line interface, on a remote host. Most network equipment and operating systems with a TCP/IP stack support a Telnet service for remote configuration.
Trivial File Transfer Protocol (TFTP)	Trivial File Transfer Protocol (TFTP) is a lightweight protocol for transferring files that is like a simple form of File Transfer Protocol (FTP). A TFTP client is implemented on the unit. By using the upload and download commands, the unit can copy a file to or from a TFTP server.

V	
VLAN	The Virtual Local Area Network (VLAN) feature helps in logical grouping of network host on different physical LAN segments, which can communicate with each other as if they are all on the same physical LAN segment.

W	
WPA	Wi-Fi Protected Access is a Wi-Fi security standard that provides a high level of wireless network security. It uses data encryption through the Temporal Key Integrity Protocol (TKIP). TKIP scrambles the keys and ensures that the keys are not tampered with. User authentication is performed through the Extensible Authentication Protocol (EAP), to ensure that only authorized network users can access the network.

Abbreviations

A	
AP	Access Point
AES	Advanced Encryption Standard
C	
CLI	Command Line Interface
G	
Gbps	Gigabit Per Second
GPL	General Public License
H	
HTTP	HyperText Transfer Protocol
HTTPS	HyperText Transfer Protocol Secure
I	
IEEE	Institute of Electrical and Electronics Engineers
IP	Internet Protocol
L	
LAN	Local Area Network
LED	Light Emitting Diode
LGPL	Lesser General Public License
M	
MAN	Metropolitan Area Networks
Mbps	Megabits Per Second
MIMO	Multiple-input and multiple-output
MCS	Modulation Coding Scheme

O	
OFDM	Orthogonal Frequency Division Multiplexing
P	
PoE	Power Over Ethernet
PIFA	Planar Inverted ‘F’ Antenna
S	
SKU	Stock Keeping Unit
SNMP	Simple Network Management Protocol
SNTP	Simple Network Time Protocol
T	
TCP	Transmission Control Protocol
TFTP	Trivial File Transfer Protocol
TKIP	Temporal Key Integrity Protocol
U	
USM	User Security Model
W	
WLAN	Wireless Local Area Networks
WPA	Wi-Fi Protected Access

Statement of Warranty

B

Warranty Coverage

Proxim Wireless Corporation warrants that its products are manufactured solely from new parts, conform substantially to specifications, and will be free of defects in material and workmanship for a Warranty Period of 1 year from the date of purchase.

Repair or Replacement

When Proxim determines that a returned product does not meet the warranted criteria during the warranty period, Proxim at its option, will either: (a) repair the defective product; (b) replace the defective product with a new or refurbished product that is at least equivalent to the original; or (c) refund the price paid for the defective product. Generally, products are repaired or replaced within thirty (30) business days of receipt of the product at a Proxim Logistical/Repair Center. The warranty period for repaired or replacement products is ninety (90) days or the remainder of the original warranty period, whichever is longer. These three alternatives constitute the customer's sole and exclusive remedy and Proxim's sole and exclusive liability under warranty provisions.

Limitations of Warranty

Proxim's warranties do not apply to any product (hardware or software) which has (a) been subjected to abuse, misuse, neglect, accident, or mishandling, (b) been opened, repaired, modified, or altered by anyone other than Proxim, (c) been used for or subjected to applications, environments, or physical or electrical stress or conditions other than as intended and recommended by Proxim, (d) been improperly stored, transported, installed, or used, or (e) had its serial number or other identification markings altered or removed.

Buyers can contact Proxim Wireless Customer Service Center either by telephone or via web. Support and repair of products that are out of warranty will be subject to a fee. Contact information is shown below. Additional support information can be found at Proxim Wireless's web site at http://support.proxim.com.

Contact technical support via telephone as follows:

USA and Canada Customers

Phone: +1-408-383-7700; +1-866-674-6626

Business Hours: 24x7 live response. Tier 3 support: 8 a.m. to 5 p.m. M-F PDT (UTC/GMT -7 hrs)

International Customers

Phone: +1-408-383-7700; 0800-916475 (France); 8-800-100-9485 (Russia)

Business Hours: 24x7 live response. Tier 3 support: 8 a.m. to 5 p.m. M-F PDT (UTC/GMT -7 hrs)

General Procedures

When contacting the Customer Service for support, Buyer should be prepared to provide the product description and serial number and a description of the problem. The serial number should be on the product.

In the event the Customer Service Center determines that the problem can be corrected with a software update, Buyer might be instructed to download the update from Proxim Wireless's web site or, if that's not possible, the update will be sent to Buyer. In the event the Customer Service Center instructs Buyer to return the product to Proxim Wireless for repair or replacement, the Customer Service Center will provide Buyer a Return Material Authorization ("RMA") number and shipping instructions. Buyer must return the defective product to Proxim Wireless, properly packaged to prevent damage, shipping prepaid, with the RMA number prominently displayed on the outside of the container.

Calls to the Customer Service Center for reasons other than product failure will not be accepted unless Buyer has purchased a Proxim Wireless Service Contract or the call is made within the warranty period. After the warranty period, Technical Support is fee based (detailed in Technical Services and Support).

If Proxim Wireless reasonably determines that a returned product is not defective or is not covered by the terms of this Warranty, Buyer shall be charged a service charge and return shipping charges.

Other Information

Search Knowledgebase

Proxim Wireless stores all resolved problems in a solution database at the following URL: http://support.proxim.com.

Ask a Question or Open an Issue

Submit a question or open an issue to Proxim Wireless technical support staff at the following URL: http://support.proxim.com/cgi-bin/proxim.cfg/php/enduser/ask.php.

C

Technical Services and Support

Obtaining Technical Service and Support

If you are having trouble using the Proxim product, please read this manual and the additional documentation provided with your product. If you require additional support to resolve your issue, please be ready to provide the following information before you contact Proxim's Technical Services team:

- Product information
  - Part number and serial number of the suspected faulty device
- Trouble/error information
  - Trouble/symptom being experienced
  - Activities completed to confirm fault
  - Network information (What kind of network are you using?)
  - Circumstances that preceded or led up to the error
  - Message or alarms viewed
  - Steps taken to reproduce the problem
- ServPak information (if a Servpak customer):
  - ServPak account number
- Registration information
  - If the product is not registered, date and location where you purchased the product

: Technical Support is free for the warranty period from the date of purchase.

Support Options

Proxim eService Web Site Support

The Proxim eService Web site is available 7x24x365 at http://support.proxim.com.

On the Proxim eService Web Site, you can access the following services:

- **Product Download Page**: Provides quick link to product firmware, software and documentation.
- **New Product Registration**: Register your product to gain access to technical updates, software downloads, and free technical support for the warranty period from receipt of hardware purchase.
- **Your Stuff**: Track status of your tickets, questions or RMAs and receive product update notifications.
- **Provide Feedback**: Submit suggestion(s)/feedback on the support Web site.
- **Find Answers**: A solution database of resolved problems, helps to find an answer to your problem.
- **Ask a Question**: Submit a question to our technical support staff who will reply to you by email.
- **Live Assistance**: Chat with a support technician on-line or request to call-back at a later time.

Telephone Support

Contact technical support via telephone as follows:

USA and Canada Customers

Phone: +1-408-383-7700; +1-866-674-6626

Business Hours: 24x7 live response. Tier 3 support: 8 a.m. to 5 p.m. M-F PDT (UTC/GMT -7 hrs)

International Customers

Phone: +1-408-383-7700; 0800-916475 (France); 8-800-100-9485 (Russia)

Business Hours: 24x7 live response. Tier 3 support: 8 a.m. to 5 p.m. M-F PDT (UTC/GMT -7 hrs)

ServPak Support

To provide even greater investment protection, Proxim Wireless offers a cost-effective support program called ServPak. ServPak is a program of enhanced service support options that can be purchased as a bundle or individually, tailored to meet your specific needs. Whether your requirement is round the clock technical support or advance replacement service, we are confident that the level of support provided in every service in our portfolio will exceed your expectations.

- **Advanced Replacement of Hardware**: Can you afford to be down in the event of a hardware failure? Our guaranteed turnaround time for return to factory repair is 30 days or less. Those customers who purchase this service are entitled to advance replacement of refurbished or new hardware guaranteed to be shipped out by the Next Business Day. Hardware is shipped Monday – Friday, 8:00 AM – 2:00 PM (PST).
- **Extended Warranty**: Extend the life of your networking investment by adding 1, 2, or 3 years to your products standard warranty. This service coverage provides unlimited repair of your Proxim hardware for the life of the service contract. The cost of an extended warranty is far less than the cost of a repair providing a sensible return on your investment.
- **7x24x365 Technical Support**: This service provides unlimited, direct access to Proxim's world-class Tier 3 technical support engineers 24 hours a day, 7 days a week, 365 days a year including Holidays. Customers who purchase this service can rest assured that their call for technical assistance will be answered and a case opened immediately to document the problem, troubleshoot, identify the solution and resolve the incident in a timely manner or refer to an escalation manager for closure.
- **8x5 Technical Support**: This service provides unlimited, direct access to Proxim's world-class technical support 8 hours a day, 5 days a week from 8:00AM - 5:00PM (PDT). Typically, technical support is provided for free for the entire time the product is covered by a Proxim warranty. Beyond this period, technical support is available at cost on a per incident basis. With the 8x5 Technical Support service, technical support will be available for the duration of the ServPak contract at no additional costs.
- **Software Maintenance**: It's important to maintain and enhance security and performance of wireless equipment and Proxim makes this easy by providing a Software Maintenance program that enables customers to access new features and functionality, rich software upgrades and updates. Customers will also have full access to Proxim's vast knowledgebase of technical bulletins, white papers and troubleshooting documents.
- **Priority Queuing Phone Support**: This service provides customers with a one hour response time for technical phone support. There is no waiting in line for those urgent calls for technical support.

Packaged Services

- 24 x 7 Enhanced ServPak
  - 24 x7 Technical Support
  - Software Maintenance
  - Advanced Hardware Replacement
  - Extends Warranty*
  - Knowledge Base Access

  - Priority Queuing

** if units are out of standard warranty*

- 8 x 5 Enhanced ServPak
  - 8 x 5 Technical Support
  - Software Maintenance
  - Advanced Hardware Replacement
  - Extends Warranty*
  - Knowledge Base Access
  - Priority Queuing

** if units are out of standard warranty*

ServPak Standalone Services

- Extended Warranty ServPak
- Advance Hardware Replacement ServPak

Proxim Warranty vs. ServPak Service

Service Features	ServPak	Warranty
Expert Technical Support	Technical Support, Configurations, Troubleshooting	Duration of Product Warranty. 8X5 Normal Business Hrs
Priority Queuing	Available	-
Knowledge Base Access	Available	Available
Software Upgrades	Available	-
Advance Replacement Service	8x5xNBD	-

- Not a feature service option

To purchase ServPak support services, please contact your authorized Proxim distributor. To receive more information or for questions on any of the available ServPak support options, please visit our website at http://www.proxim.com/support/servpak, call Proxim Support (For telephone numbers, see Telephone Support) or send an email to servpak@proxim.com.

Technical Support Policy

Technical Support for Current Products during Warranty Period

All Customers are entitled to free technical support for the Proxim products they purchase from Proxim's authorized resellers or distributors. Technical Support is defined as communication via the Proxim Support website (http://support.proxim.com) and/or via telephone. This technical support will be provided for free for the entire time the product is covered by a Proxim warranty. The term of Proxim's warranty is determined according to the agreement under which the product was sold and generally varies from 3 months to 2 years depending on the product. If a Customer disagrees with Proxim's determination of warranty duration, a request for review supported by a copy of all product purchase documentation may be submitted.

Technical Support for Current Products after Warranty Period

After the warranty period, technical support on products then being sold by Proxim will be based upon one of the following three options Customers can choose:

- Customers can choose to purchase one of Proxim's ServPak extended warranty and enhanced support packages for the product
- Customers can choose to purchase one-time per-incident technical support for the product for a fee
- Customers can choose to call the reseller or distributor who sold them the product for technical support

Tech Support on Discontinued Products

Technical Support on some products that Proxim has declared as EOL (End of Life) or otherwise is no longer selling is available based upon one of the following three options Customers can choose:

- For some discontinued products, Customers can choose to purchase one of Proxim's EOL ServPak support packages for the product
  - No EOL ServPak support package will be available for any product discontinued more than 5 years ago
  - No EOL ServPak support package is available for certain discontinued products
- Customers can choose to purchase one-time per-incident technical support for the product on a per hour basis at a rate of $125 an hour (4 hours minimum payable in advance by major credit card). This fee is payable in addition to any RMA fee that may be charged to subsequently repair the product.
- Customers can choose to call the reseller or distributor who sold them the product for technical support

All Proxim technical support for discontinued products, whether through an EOL ServPak package or otherwise, is provided on a "best effort" basis and is subject to the continued availability of necessary components, equipment, and other technical resources.

Note that Proxim is unable to support or warrant any equipment that has been modified, whether this modification is physical, or if third-party software codes have been loaded onto the product.